VCU College of Engineering
Mechanical and Nuclear Engineering

EGMN 312: Thermal Science Lab

General Lab Report Guidelines

Formatting

Structure

All EGMN0312 Lab Reports will be written using the EGMN-312 Lab Report Template, available on CANVAS, in the Modules on the EGMN-312 website. All writing will be in Times New Roman font and 12-point size. All paragraphs will be indented 5 spaces and no blank lines between the paragraphs.

Page Layout Setting

A special banner is used on page 1, with the course title and instructor name. Nothing needs to be edited in the header or the footer of Page 1. In the main section of page 1are labels for the lab report title, section and group numbers, and the date and time the lab was executed. A comma should separate the section and group numbers, and the date (including the full year) and time. These are all to be typed in normal 16-pt Time New Rome, *not bold*.

Finally, there is a place for the student's name (first name first, then last name last) and the other students who worked with the student while executing the experiment. The Partner's Names (again, first name first, then last name last) should be a vertical list in alphabetical order, by last name. All of the student's typing must be in a normal (not **bold**) font. Do your best to align the first names.

On the following pages, there is a header and a footer, which are repeated on all subsequent pages. The student must add the experiment title in the middle of the header and their last name to the right portion of the headers. Use the formatting which is there. (New Times Rome, 12, normal)

In the following sections (body) of the report, use 12 point "Times New Roman" font, with 1.5 line spacing and left justification.

The paragraph format used in EGMN-312 lab reports is a modified indented format where all paragraphs are indented 5 spaces, with no extra spaces between paragraphs (much like this document.). While this document inserts an extra vertical line between sections, since the assigned Report Cover has each section start on a new page, you will not have to do this. All paragraphs are expected to be at least five sentences long for full credit.

Equations mentioned in the report will be centered with an ordinal number in parenthesis on the right. However, when listed in the Appendix, the number will be numbered on the left. More details later in the guidelines.

IEEE-style reference footnoting will be used in this report. See the extract (pdf) from the full IEEE Style Manual in the CANVAS modules for details.

Introduction (10 points)

Just as in a 5-paragraph essay, write an introduction that introduces the reader to the experiment. Expect the reader to be a student or professor who is unfamiliar with Solid Mechanics Lab but understands technology. The introduction should include the objectives/purpose of the experiment in a logical narrative format. Use direct language and complete sentences. If you are stuck, consider the question "What is to be demonstrated in this lab experiment?" It is expected that the introduction should be 5+ sentences. Less sentences, fewer points.

Background (10 points)

Who did the original thinking? Who were the early investigators? What are the relevant theories and principles behind this experiment? Who has also done useful research in this field? You will do some research and dig for this in your textbooks and other reference material. Provide a primary reference. (Wikipedia can be a secondary reference.) I am looking for 3 strong paragraphs. (Each paragraph should be 5+ sentences long.)

Apparatus and Equipment (5 points)

This section had two parts: First, ONE image (picture or illustration) of the apparatus, under the "Apparatus" label, labeled as "Figure 1" with an appropriate title at the bottom.).

Then the "Equipment List" label, with a bulleted list of experiment used during the experiment, with manufacturer names and Model numbers. Reference the source of all diagrams/photos and be sure to include them in the "Literature Cited/References" section.

Methods and Procedure (5 points)

Then, in the Method section (at the top of a new page) start by writing what procedure your group used during the experiment and where it came, with an IEE footnote for the source document of the procedure.

Then write a narrative of how the group followed the procedure while conducting the experiment, and if they did not, how did they vary. Include details about what data was collected and by whom when measurements were gathered, and where were they recorded. Write the "Method" section in third person, past tense. (No use of first person!)

A written procedure is provided, but how the student executes the experiment may vary from the written instructions. Hence the requirement of Methods section. It is to be a narrative, paragraph-based, that describes how each step of the assigned procedure was followed or any deviation from the procedure that occurred and why.

Results and Analysis (20 points)

Remember that data in lab notebooks is NOT in a report table. So, the very first thing that you mention it, is that you moved it from the notebook to a table in your report. Then this section is used to explain how collected data is transformed into information. Where did the data come from (table name & label, and variable name) how was the data processed (equation used) and where did the information go (destination table name & label)? Be sure to reference ALL equations and ALL tables and ALL graphs. Be sure to display results in appropriate significant figures and use proper units. For data collected, show the highest precision on the instrument (seldom better than 2-4). For data calculated, show 6 significant figures. In final data tables and graphs, round to 3-4 "Sig Figs" as appropriate. (Up to 10 pts can be lost)

Make each equation/table/graph referenced made **BOLD.** Points will be lost for each equation, figure or table in the Appendix that is not referenced in this section or not in BOLD. (Up to 10 pts)

Discussion (20 points)

In this section, the students are to answer some basic questions: Does this section explain the implications of the results from the previous section? (I.E., how do the results compare to expected or theoretical values?) What is the meaning of the results? What were the challenges of conducting or analyzing the experiment? Does the discussion talk about possible legitimate source of errors and/or the size of errors in the experiment? Finally, were all the questions mentioned in the Student Handout addressed? Typically, there are at least five paragraphs in this section. (1-2 pages)

References (10 points)

Cite all sources (textbooks/journals/websites/reports) an IEEE format. The basics are that the cited material will be listed in the Reference section immediately before the Appendix. All references will be number at the left margin, sequentially. When the source is cited in the report, use square bracket and the number of the reference (i.e. [1]). Given the need to cite the written procedure, to provide sources for your background section, and citations for all pictures/images, it is expected that there will be a minimum of 3 citation in this space.

Appendix (20 pts)

In general, all figures (tables, graphs, photos, diagrams, etc) belong here. The only exception is that figure(s) you included with the Procedure section of the apparatus. Remember that if you created the table, it must be labeled as “Table”. If you are copying a table from a source, then it is a “Figure” and labeled as such. Be sure to show a footnote and reference as to its source. Are all required tables, charts and figures presented in the appendix? Deductions for each missing item? (Up to 10 pts)

The Appendix starts with a list of equations, numbered on the left (because if you are looking for an equation, it is easier if it on the left.). Next, if the equation has a title (Newton’s

1st Law of motion) insert it in line. Finally, the equation in proper format. (Times New Roman, 12) This includes any unit conversions you might have done. If you wish to include a list of variable names, put them at the end of the equation list.

Remember that when you created the table it must be labeled as a "Table #" with a number and a title, all at the top. Tables must have column headings, units and consistent, and appropriate significant figures

After the tables, come the graphs. These are labeled as "Graph #"and are to be appropriately labeled at the TOP. (Graphs require only one title.) Be sure that the axes are appropriately labeled, include a legend if there are multiple lines (never smooth the lines). Please use symbols/line style for each line, not color. (If you are making a comparison of two values, is this a proper X-Y Scatter plot and is there a proper equation. R-value, and line shown?)

After Graphs, come everything else, figures, sample calculations, design solutions. Please remember that Figures need to be labeled ("Figure #) and titled AT THE BOTTOM.

Please do not use letters after number. Just Table 1, then 2, then 3, etc.

Finally, the last item(s) in the Appendix is a scan or photo of the relevant pages from your lab notebook of the collected data. These are Figures, but special, I want them at the end of appendix.

Tardiness

The overall report score is out of 100 points, with deductions for late submissions and errors.
Late submissions will be penalized as follows:

- 1 second to 1 hour late: -2 points
- 1 hour and 1 second to 1 day late: -5 points
- 1 day and 1 second to 1 week late: -10 points
- 1 week and 1 second to 2 weeks late: -20 points
- 2 weeks and 1 second to 3 weeks late: -30 points
- 3 weeks and 1 second to 4 weeks late: -40 points
- More than 4 weeks late: 0 points, do not submit.